COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper- Second-class postage paid at Boston, Mass.

Vol. III No. 27 | July 9, 1969 | Price: $9/year

User May Pay 25% More as Result of IBM Unbundling

By Peter L. Briggs
CW Staff Writer

Separate pricing, long awaited by various members of the data processing industry, has finally materialized. It seems, however, that several key factors may be overlooked in the rush to judge separate pricing as a boon to this or that industry or type of user.

Combining the intra-industry impacts, it's clear that the user will end up paying a larger total bill than he would have prior to the announcement. He'll probably be paying 15% to 25% more if he still obtains most of his software and services from IBM.

This is not unreasonable, considering the way in which people have paid for services up to now. It seems that IBM may be tightening its corporate belt in preparation for serious changes in

CW News Analysis

the nature of the industry; changes that IBM may be bringing to pass. When the still-remaining 97% of the old price is added to the total cost for compilers, sorts, utility programs, and applications programs, a fairly hefty bundle exists. The true size of this bundle must remain undefined because of the different needs of many users, but it is fairly certain that a company as successful as IBM has been will not thoughtlessly give anything away, and never really has.

The price increases simply represent the increases in costs for programmers, materials, marketing, advertising, and overhead. These are rising costs that every company in every industry is

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Cartoonist Rube Goldberg is introduced to a 360/40 by Edward Openguart. Quipped Goldberg: "It looks like something I would have done, with all the signs and lights."

Unbundling 'Biggest Price Increase Yet'

Increases of up to 25% in data processing costs are being expected by major users of IBM equipment as the primary result of IBM's recent unbundling.

"In my opinion," said Paul Williams Jr., president of Boothe Computer Corp., "IBM's pricing change, effective Jan. 1, 1960, of an overall 3% reduction is, in fact, the largest price increase in the history of the data processing industry.

"This change will increase IBM customers' costs by some 20%," he said, mainly because of additional costs customers now expect to incur for program products, systems engineering, and education.

Said Richard Jones, president of Applied Data Research, "As an IBM user, we see user costs going up by some 25%, with the 3% hardware price decrease offset just in costs of education."

Jones was disappointed in the unbundling announcement because IBM "still said nothing about the possible separate pricing of maintenance, support, and enhancement of existing software packages or of decreases in hardware prices tied to such areas."

Government Hit, Too

In Philadelphia, the head of a computer department at a large defense installation forecast a substantial increase in computer costs saying: "It's going to cost us at least 10% to 15% more on the open market to receive the support services IBM has been providing free, and the 3% reduction in IBM equipment prices isn't going to make much difference."

An official in New York City believes that unbundling could increase New York City's computer costs "by $1.7 million a year, mostly for systems engineers."

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New System Monitor Called 'Missing Link'

NEW YORK – A new communications package for the IBM 360 is intended to provide a comprehensive package that blends the accessing of data, the operating system, and the data base into a single environment.

Programming Methods, Inc., the developer, calls the package the "missing link" of communications and says it provides "immediate access to a computer at a fraction of the cost and manpower required by the user to develop a system of his own."

Called Intercomm, the package costs $45,000 plus $5,000 for installation, including configuration for the particular system used. It will run on any 360/40 or larger system, the company said.

The package is claimed to provide three basic functions to service its environment: control for the teleprocessing environment, control for the data and file-handling processing, and scheduling for all the application programs accessing the data system.

Operating under both DOS and OS and using either Basic or queued telecommunications, Intercomm supports access between any of the application languages supported by the system, the company said.

Goldberg Honored

Programming Methods introduced Intercomm at a press conference at which it honored Pulitzer Prize-winning cartoonist Rube Goldberg on the eve of his 86th birthday.

"His comic inventiveness and design ingenuity have become a beloved legend in the world of technology," said Edward Openguart, senior vice-president of the firm.

Goldberg, who earned fame with incredibly complicated "inventions" for performing simple

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S/360 Users Offered T/S Via Call/360

WHITE PLAINS, N.Y. – Time-sharing, in the form of Call/360, has been announced by IBM for the general user on the S/360. It will be included under OS/MFT (multiprocessing with a fixed number of tasks), will require 348K of memory, and ought to be fairly efficient, according to several expert sources.

No information is currently available as to whether or not IBM will place a price tag on this piece of software, but if it does, it will probably be a stiff one, *Computerworld* was told by an industry source.

No Datatext/360

The package will include three languages, Basic, Fortran, and PL/1. No mention was made of including the text-editing package, Datatext/360, which is available with Call/360 from the Service Bureau Corp.

Operating under MFT in one partition, Call/360-OS will offer the full command language capabilities for preparing, storing, and debugging programs. Minimum machine requirements are a 360/50 with at least 348K memory, or any larger system in the S/360 line with at least 512K memory.

Release date for the system is scheduled for the second quarter of next year.

Adapso Announces Stand Against Hardware Discounts of Any Kind

NEW YORK – The Association of Data Processing Service Organizations has taken a stand against the granting of hardware discounts to governmental, educational, and charitable organizations as well as to profit-making organizations.

"Where such discriminatory pricing has the necessary effect on competition, it constitutes a violation of law, for which the guilty manufacturer will be held [illegible]able in damages to any [illegible]rcr [illegible]r who has been dam[illegible]," Adapso said.

[illegible]nts to nonprofit groups are often justified on the grounds the purchaser must agree that the equipment will not be used in competition with profit-making organizations. "Such discrimination may not be unlawful . . . [and] may even be in some cases in the public interest," Adapso said.

"In practice, however, despite these agreements, such purchasers with impunity almost always employ equipment purchased at these discount prices . . . in competition to some degree," the organization concluded.

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Another Case in the Offing

Supreme Court to Rule on Services Offered by Banks

WASHINGTON, D.C. – The U.S. Supreme Court has agreed to rule on whether banks can offer DP services to other banks and to bank customers in competition with service bureaus.

The U.S. comptroller of the currency ruled in 1966 that national banks could offer DP services to other banks and bank customers.

Challenge Filed

The challenge was filed by the Association of Data Processing Service Organizations and Data Systems, Inc.

The suit named as defendants the comptroller and American National Bank & Trust Co., a St. Paul bank which offered data processing services under the 1966 ruling.

The suit alleged that DP services are beyond the scope of bank activities authorized by the National Bank Act and that letting banks engage in such services would cause "substantial" harm to independent data processing concerns. A federal district court dismissed the suit by ruling that competitive injury alone wasn't sufficient ground, and that the concerns therefore lacked standing to sue.

Ruling Affirmed

The Eighth Circuit Court of Appeals in St. Louis affirmed the district court ruling.

In a similar case, the First Circuit Court of Appeals in Boston ruled that a service bureau did have grounds to sue a bank and the comptroller of the currency. The comptroller has asked the U.S. Supreme Court to review the case. No action by the court is expected before fall.

Case in Point

In the case, the Wingate Corp. of Providence, R.I., is suing the Industrial National Bank and the comptroller. Boston Federal District Court ruled that the service bureau had no standing to sue, but the superior court ruled March 27 that the company did have grounds.

DPSA Fall Meeting to Be in New York

STAMFORD, Conn. – "Data Processing OCR Input/Output Technology" will be the theme of the Data Processing Supplies Association's fall general meeting.

Meeting in New York

The meeting will be held in New York at the Park Sheraton Hotel, Oct. 27-29, during the Bema exhibition.

This, according to Thomas Evans of Control Data Corp., DPSA president, is the next step in expanding the DPSA OCR workshop, which was given in Montreal June 16 and 17, and the DPSA presentation at the Data Processing Management Association Conference June 18 in Montreal.

Fee Listed

In order to broaden the scope and the coverage on OCR technologists at the fall meeting, the public will be invited to attend for a fee of $150.

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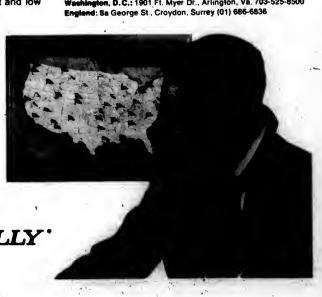

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Cybernet's Eastern region consists of three Control Data super-scale 6600 computers in Boston, New York City, and Washington, D.C.

Cybernet Uses Telpak A To Speed Data Transfer

MINNEAPOLIS, Minn. – Cybernet, Control Data's four-month-old computer network, has a couple of special communications features.

On the East Coast, Cybernet is using Telpak A, which sustains a data rate of 6,000 char/sec. This speed is achieved through wide-band line use; the higher highs and lower lows mean that less time is spent determining whether a signal is present. As an example of the efficiency of wideband communication, the company talks of transmitting a full standard magnetic tape, through a buffer, in something like one-seventh of the time required by a normal voice-grade line.

Undergoing user tests in the Detroit center is new software, designated Shadow (for file management) and Shade (for message handling). One feature of the dual package gives the user the ability to shop the entire system (nationwide, when the full system spreads that far) for a job queue, on either a 3300 or a 6600, that most suits his immediate requirement. The nationwide system now has five 3300s and seven 6600s.

The system has software that includes a Fortran IV compiler, Cobol, Algol, Simscript, Ophiele (a French-developed Linear Programming package), Ziptran (a system that assigns zip codes to street addresses), full APT, and a number of engineering-statistical packages.

Control Data announced last week that it will market computer time through its Cybernet services to independent service organizations on a wholesale, retail, or OEM basis. The announcement was made at a meeting of the Association of Data Processing Service Organizations by Robert O. Young, director of marketing for CDC's data centers division.

Young pointed out in his announcement that independent service bureaus may now buy super-computer time at any one of 30 data centers throughout the country and resell the time at a profit, or sell the results of the processing as is now being done.

Special Class of Common Carrier Is Urged for Data Transmission

WASHINGTON, D.C. – The establishment of a special class of microwave common carrier for data transmission has been recommended by the Computer Time-Sharing Service Section (CTSS) of the Association of Data Processing Service Organizations. The recommendation was made to the House Subcommittee on Activities of Regulatory Agencies Relating to Small Businesses.

"These common carriers should be able to take advantage of technical advances to offer low-cost service to customers," Joan Van Horn, CTSS president stated. "They would also provide competition to transmission of data by the telephone company and thereby foster improvements by both."

Miss Van Horn, president of VIP Systems, Inc., listed four other points for consideration by the subcommittee in its inquiry into allocation of the radio spectrum among various classes of users. They were:

- In any consideration of spectrum allocation and/or national communications policy, a major concern should be the facilities to be provided for data transmission to and from computers. The inquiry by the Federal Communications Commission in Docket No. 16979, and its ongoing inquiries are all important steps which mark an important beginning to a re-evaluation of our current system of priorities among competitors for use of communications media.
- As a principle, there should be provisions for (and encouragement of) pilot programs designed to test the quality and efficiency of service for the transmission of data using microwave, television and/or CATV. It is important that the current classification of classes of service and the usual excess demand for frequencies or channels not be allowed to foreclose experimentation.
- Consideration should be given to the potential of using land lines (e.g., CATV and telephone) for local distribution and using the spectrum for long distance multiuse transmissions.
- Given the current status of spectrum allocation there should be authorized, on an experimental basis, the use of television channels for the transmission of data.

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IBM Unbundling Is Called 'Largest Price Increase in History of Data Processing'

(Continued from Page 1)

He indicated that New York has initiated a fight to cut these costs by upgrading civil service classifications, setting up data processing courses for city employees, and improving contract standards in seeking non-IBM services.

On Tha Other Hand

A consensus of smaller system users, however, indicated different areas of interest. Very few users of IBM 360/20s, 30s, 1401s, and 1440s appeared to show much excitement over the unbundling announcement, or possible cost increases.

The major concern for the "smaller" user seems centered in the potential heavier costs for education.

The smaller users also indicated that the 3% reduction in hardware prices was quite minimal.

Reaction was mixed when these users were asked whether unbundling would be beneficial to them.

About half of those surveyed felt that unbundling would stimulate competition and result in lower prices, but some data processing managers said that the small user would be hurt because he relies on IBM for total support, and would find it difficult to "play the field" on relatively small maintenance and support functions.

Correction

In last week's page 1 story on IBM's announcement of separate pricing, it was stated that Levin-Townsend had an antitrust suit against IBM. This was an error. Levin-Townsend has not filed against IBM.

"Programs! Programs! Step Right Up and Get Your Programs!"

IBM Has Discontinued All Keypunch Training

ARMONK, N. Y.–One of the sleepers buried in the six-page announcement of new IBM corporate policies was the statement that keypunch training was being discontinued, IBM has prepared a complete package of prices for all remaining educational courses.

Private Kaypunch Schools Thrive

According to Richard Littlehailes, president of Keyboard Training, Inc., KTI has been "flooded with requests. We are making an effort to expand our staff, but it will take some time,", he said.

Prices From $30 to $1500

Of those courses that will be available to users for a charge, the prices vary quite widely. The least expensive course listed, "Fundamentals of Programming Workshop," was priced at $30, while the most expensive course was listed at $1,500 (S/360 OS Workshop).

Many of the basic courses dealing with computer fundamentals, numbering systems, system Introductions, and basic language instruction use self-instruction or programmed-instruction techniques and are still free, except for the cost of materials.

The most expensive courses fell in the areas of OS systems programming and industry application education. In general, the courses for the 360/20, 1130, and DOS were significantly less expensive.

Up to $5,780 per Programmer

A typical price for a person becoming a programmer using OS and following IBM's recommended course list would amount to $1,010. For DOS it would amount to $730. For a systems programmer with OS, the cost would amount to $5,780; for DOS, $2,600. These prices do not includa the charges for programmed or self-instruction course materials.

Monitor Called 'Missing Link'

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tasks, has been called a one-man insurrection against the needlessly multifarious gadgetry of the machine age that enslaves man instead of freeing him from nonrewarding labor.

Asked for a comment on Intercomm, Goldberg said, "My only objection is that it works. My contraptions looked lika they worked, but never did."

Unbundling May Raise User's Costs by 25%

(Continued from Page 1)

currently trying to handle. Consumer prices are continually on the rise in this industry as well as every other. Consumers in the computer industry have been pretty effectively sheltered from these rising prices by rapid growth of tha industry. This shelter has coma under the aegis of IBM. What can be expected when everything else gets more expensive? You can get less expensive computers, but you can't lower your overhead for personnel and space.

If one considers how much he, as a user, would have been forced to spend for the amount of "frea" consultation received from IBM systems engineers, he will probably be amazed. It appears that this particular area has been of concern to IBM, too. The new multilevel support arrangement seems to offer a realistic price for expert consulting. This does imply that the dead wood will have to be trimmed from the systems engineering structure, as it must from any direct profit center. It can be expected that tha individual user will receive much better quality support than has been delivered over the past 10 years.

What About Software Revisions?

QUESTION: Will revisions to Type 1 and 2 programs be available without charge, or will they be marketed for a license fee?

ANSWER FROM IBM: Regarding Type 1: New or enhanced components may be announced and delivered as Type 1 for System/360, 1130, and 1800 systems; some may be program products.

Regarding Type 2: No new programs will be designated as Type 2. When bugs are reported in existing Type 2 programs prior to Jan. 1, 1970, IBM will correct the bugs in the same way as before. After Jan. 1, 1970, we will continue to distribute corrections to all users of programs with Class A and B service classification. We will make no functional improvements beyond the corrections of errors to any axisting Type 2 programs.

No Unbundling, Honeywell Says

WELLESLEY HILLS, Mass. – Honeywell will maintain its package pricing policy for data processing computer systems rather than follow the recent IBM separate pricing decision, the company said last week.

Honeywell was the third computer company to announce a decision on unbundling. Burroughs announced June 23, the same day as IBM, that it was separating the pricing of hardwara, software, and services [CW, July 2]. Other manufacturers, such as Control Data and Univac, told CW they were still studying the situation.

Honeywell also announced it was raising rental prices by about 1%.

Tha Honeywell decision was made after a six-month study by specialists of the pricing of data processing products and services. Board Chairman James H. Binger said a prime objective was to meet tha needs of customers and maintain a competitive posture.

Based on this investigation, Honeywell's EDP division will continua its normal customer support, education services, software and applications systems and maintanance in accordance with present policies, he said.

Normal services will continue to be covered by the rental charge for lease customers or the purchase price for purchase customers, the company said, adding that Honeywell contract policies for data processing computers and equipment will remain as they have been.

"Our studies indicate that with separate pricing, customers will have difficulty predicting their future full costs and the majority will pay significantly more in the future in order to continue to get the data processing services they presently are receiving," said C.W. Spangle, vice-president and general manager of Honeywell's EDP division.

"By contrast," Spangle said, "Honeywell has been a pioneer in stabilizing computer industry prices through the development four years ago of long-term pricing agreements. Thesa agreements enable users to better plan and control their future data processing costs."

"Honaywell customers are continuing to enjoy discounts of from 3% to 11% over normal one-year contracts in exchange for signing long-term contracts," Spangle pointed out. "Long-term contracts will continue to be available," he said.

Honeywell's rental prices are being raised by approximately 1% for leased systems, reflecting rising costs of labor, materials, and interest. Adjustments also will be made in maintenance rates for purchased systems. Most existing Honeywell customers will not be affected by this change during the term of their agreements.

In view of the effect of the price changes announced by competition, Honeywell's favorabla price-performance advantage is enhanced, Spangle noted.

Price of CE 16 Mini-Computer Cut

EL SEGUNDO, Calif. – A $920 price reduction on Scientific Data Systems' CE 16 mini-computer has been announced.

The basic computer, including 4,096 words of 16-bit core memory, three priority interrupts, and an automatic input/output feature, will be reduced from $10,000 to $9,980.

An option to expand the computer's memory from 4,096 to 8,192 words was also reduced $750, from $6,200 to $5,450.

Along with the price reductions, SDS also announced that the ASR 33 Teletype previously priced as an intregal part of the mini-computer system would now be sold separately to accommodate customers not requiring this peripheral device.

A small controlling/computing unit designed for general-purpose applications in industrial, aerospace, and educational projects, the CE 16 computer is one of a line of system building blocks marketed by SDS.

The computer, the product of a joint development effort between SDS and Computer Automation, Inc., is based on CAI's Model 816 and is manufactured by CAI to SDS specifications.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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Errors in DP Reservation System Result in Overbooking of Flights

BOSTON – An error in a computerized reservation system caused overbooking on some Northeast Airlines flights, and Northeast is now manually checking reservation lists for many of its flights.

Northeast has been using two IBM 360/75s and IBM's Pars (programmed airline reservations system) since late May. According to a Northeast spokesman, the error occurred in the area of "inventory reconciliation." Under Pars, if a seat is sold and assigned to a person, the numeric inventory of available seats should be reduced by one. This did not happen in some cases.

Since the exact error has not been detected, Northeast is now manually checking the reservation lists for all planes booked to more than 75% of capacity.

As yet, Northeast has not determined if the error is a bug in the programming, or if an agent somewhere is doing something that the designers of the program did not anticipate, and thus inadvertently causing the overbooking.

The problem first showed up Saturday, June 14, and became severe Sunday, June 15. Many of those affected were traveling from Boston to the DPMA show in Montreal. They arrived at the airport with confirmed reservations, only to be told that no seats were available.

To accommodate people who were denied boarding, the airline "rolled" passengers. That is, passengers denied boarding on the 12:05 flight were put on the 3:30 flight, which meant that passengers with confirmed reservations on that flight were denied boarding. They were put on the 5:30 flight, however, bumping other people with confirmed reservations. Some of those who were denied boarding on the 5:30 flight were flown to Burlington, Vt., and taken by bus to Montreal, arriving more than four hours late.

Civil Aeronautics Board regulations require that a person who has a confirmed reservation and is denied boarding be accommodated on the next available flight, or be provided with alternate transportation. The CAB considers a flight which is already fully booked to be unavailable for the purposes of this regulation.

If, as a result, a passenger cannot be gotten to his destination within two hours (four hours on international flights), he may be entitled to compensation equal to the price of his ticket, but not more than $200 or less than $25. In addition, his ticket is still good.

Payment of denied-boarding compensation is based on estimated rather than actual arrival time. Thus a person who is put on a plane scheduled to arrive three hours later cannot receive denied-boarding compensation even if the plane is delayed by weather or mechanical difficulties.

CAB regulations also require that persons denied boarding be given a printed copy of the CAB regulations at the time they are denied boarding. A number of persons affected by the overbooking June 15 claimed that Northeast failed to do this. They also charged that Northeast personnel were impolite and differed off complaints on the grounds the problem was caused by "computer error." A Northeast spokesman, who declined to be quoted by name, explained that harassed airline employees "always look for an easy excuse to pacify passengers."

Northeast is not the only airline to have overbooking problems. The CAB reports that half-a-million passengers have been bumped in the last 19 months, but the agency also points out that this is less than 1% of all U.S. air travelers.

Airline officials will not admit to overbooking, but a CAB spokesman said that many airlines overbook some flights based on the average number of no-shows.

A Northeast spokesman noted that another kind of overbooking occurs when a travel agent sells a ticket for a plane which he knows is already booked, and never enters the reservation with the airline. Then the passenger arrives at the airport with a "confirmed" reservation which the airline knows nothing about. Asked how often this occurs, the Northeast man would only say "lots."

Tailor-Made Packages Are Often Unneeded: Bagley

NEW CANAAN, Conn. – "Computers are being used by most job-lot manufacturers as status symbols, something to show a visitor, and are producing none of the economies and efficiencies they are capable of," according to Edward R. Bagley, president of Systek Computing Corp.

"The management of such companies, when they do seek outside information systems expertise, often spend twice as much as necessary and are stalled for many needless months, because they want a tailor-made system under the mistaken belief that their informational and control needs are unique.

"It amounts to re-inventing the wheel for every company," Bagley continued. "Actually, we have found that a good 80% of what is needed by management to operate all aspects of the job-lot manufacturing company is the same, thereby requiring tailoring for only 20%."

Job-lot manufacturers, producing a "widget" now, and a "gidget" next, were having the most difficulty in designing a viable management system, utilizing a computer, so Systek, a consulting firm, has concentrated in that market, he said.

Earl Binin, Systek's authority in management information systems, said, "I've seen corporation presidents confronted each Monday with a dolly-load of computer printout which he couldn't read in a week's time."

"It's another form of status symbol," Charles L. Allen, Systek's expert in financial management, stated.

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TLW COMPUTER INDUSTRIES

Typewriter Entry System Claimed Faster and Cheaper

SEPULVEDA, Calif. – Reduced cost of computer-usable data and business documents is the claim for the latest entry in the punched-card replacement field.

The Dataplex system, developed by Data Instruments Co., features a specially modified standard typewriter keyboard that can be producing business documents at the same time it is transcribing the information to a cassette.

The data on the cassette is then processed (after transmission from a remote location, if necessary) by special software and a mini-computer onto computer-compatible magnetic tape.

The hard-copy output provides the medium for visual verification. Correction is easily made, either as the record is being transcribed, or afterwards on the cassette, the company says.

Cost reductions of 40% to 70% over other techniques are claimed. The benefits stem from increased speed of entry, ease of making corrections of either a current record or of one already on the cassette, and the ability of entering all the information from a single transaction, as opposed to the limitations imposed by the more usual short, fixed-length record used by earlier key-entry devices.

The developer says that Dataplex can produce tapes compatible with any 9-track, 800-bit/in. or 7-track, 556- or 200-bit/in. system, and that a 1600-bit/in. capability will soon be added.

System components are priced as follows: The typewriter terminal costs $2,850, or can be rented for $84 per month and the Dataplex processor carries a purchase price of $24,950, with a rental of $695 per month.

Deliveries from production will start during the latter part of the fourth quarter, the company says, or about 120 days after receipt of order.

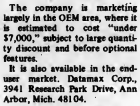
The company is located at 16611 Roscoe Place, Sepulveda, Calif. 91343.

New Products

4,800-Bit/Sec Modem

A new modem is described by its manufacturer as the first to offer 4,800-bit/sec transmission over dial-up lines and forward error correction at the receiving point. It has been announced as available for delivery 60 days after receipt of order.

The unit is designated 3B48 by the maker, Datamax Corp. An optional feature is the ability of multiplexing lines, as long as the 4,800 rate is not exceeded in gross.



The company is marketing largely in the OEM area, where it is estimated to cost "under $7,000," subject to large quantity discount and before optional features.

It is also available in the end-user market. Datamax Corp., 3941 Research Park Drive, Ann Arbor, Mich. 48104.

18-Channel Multiplexor

Data communication over as many as eighteen 110-bit/sec or seven 200-bit/sec channels is possible with newly announced frequency division multiplexors.

They are designated FM-6000/FM-8000 by the manufacturer, Technitrend, Inc., which says that "both systems substantially reduce line costs in multichannel, intermediate-speed data applications." The unit can be equipped for half duplex, full duplex, hub operation, or even one-way operation.

They were designed for time-sharing use, but are also described as applicable in data communications systems in a number of industry areas.

Fully loaded systems cost approximately $1,100 per channel and are deliverable in 30 to 45 days after receipt of order, according to the company.

Technitrend, Inc., 7300 N. Crescent Blvd., Pennsauken, N.J. 08110.

Tape Recorder

A magnetic tape cartridge player is said by its developer to be capable of either parallel or preprogrammed sequential modes of digital or audio information.

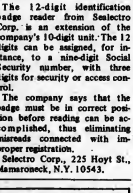
The Multi-Cart holds up to 12 cartridges. Playback is controlled by buttons, all of which may be active at a given time, using separate channels.

The unit features both data and voice channels at speeds of 3-3/4 to 7-1/2 in./sec, automatic start/stop, and remote control. Multi-Cart can operate either in playback mode only, or optionally, in record or playback. Playback-only units cost $2,360 in quantities of six, with record/playback units selling for $1,135 each. Delivery is stated to be 60 days after receipt of order.

Ampro Corp., 1 Limekiln Pike, Glenside, Pa.

12-Digit Badge Reader

Largely aimed at the OEM market, but fitting into the expanding area of personal identification, is a new badge reader.



The 12-digit identification badge reader from Seelectro Corp. is an extension of the company's 10-digit unit. The 12 digits can be assigned, for instance, to a nine-digit Social Security number, with three digits for security or access control.

The company says that the badge must be in correct position before reading can be accomplished, thus eliminating misreads connected with improper registration.

Selectro Corp., 225 Hoyt St., Mamaroneck, N.Y. 10543.

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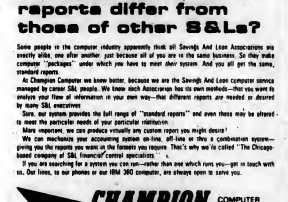

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Female Enrollment High In Computer Program

By Patricia Coffey
CW Staff Writer

WELLESLEY HILLS, Mass. – The first public education program in computer management directed specifically at college graduates has a 30% female enrollment.

The eight hour a day, five day week, three-month course that began June 9 was initiated here by Honeywell.

A Vassar graduate, working as a programmer at a mutual funds firm in Boston, felt that although she had taken a basic course in programming, she had not received enough training to pursue a career in the computer field.

Students enrolled in the program have a variety of degrees with a heavy concentration in business administration and liberal arts. There are also science and education majors.

One graduate of Boston College has been accepted at Columbia Law School in the fall. He then plans to attend a business school, then hopefully will go on to Wall Street.

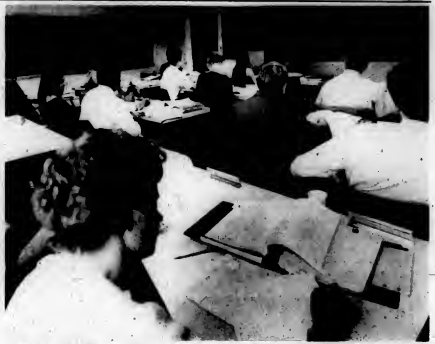
He's attending the program to round out a blind spot in his education because he knows that computers will figure more prominently in the stock market when he's ready for it in four years.

Most students are taking the course because they know the computer field is lucrative, growing, and in need of people. But the students lack qualifications, and they feel they can attain them with this program.

An education graduate of Boston University wants to remain in that field, but not as a teacher. She hopes this computer education will enable her to combine the two fields so that she can work in the area of computer-assisted instruction.

The idea of the intensive course was conceived by Jack McMurrer and Mike Mahoney, who were working in computer operations for Honeywell in Cincinnati. They obtained corporate go-ahead to conduct a survey among college seniors in the Boston area last fall.

A plan to implement the program nationally is being studied.



First class of students shown in session with instructor Richard Grenka at Honeywell's post-college graduate program, which lasts 12 weeks.

EDP Schools Course Standards Issued

CHICAGO – The Division of Continuing Education of the Office of the State Superintendent of Public Instruction of the State of Illinois has issued minimum course standards for private schools teaching data processing.

All of the EDP schools in the state, with the exception of some correspondence schools, meet the standards.

The standards, which take effect Jan. 1, 1970, require that a school offering a programming course, for example, must include 75% of the subjects to be dealt with in the course in a list of twelve topics.

Since none of the 12 is a required topic, a school could conceivably exclude such subjects as introduction to data processing, testing and debugging, and flowcharting and block diagramming, and still be within the minimum requirements.

The minimum standards were put together by a committee chaired by Mrs. Colleen Colby Kurtz, president of Bryant and Stratton College, Chicago.

Generally, the schools are meeting requirements in the area of hours (minimum of 435 hours for programming course), but some are not meeting the course contents requirements.

Thomas E. Richardson, assistant director, private business schools, said that the standards are subject to revision.

Reviewing a flow chart case study for use in graduate course in Wellesley Hills, Mass., are (from left) Charles Cotton, William Epps, Jack McMurrer, director of studies, Shaun Brennahan, Charles Fuchs and Robert Gillespie.

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Editorials

New Competition

With all the furor over IBM's decision to price certain types of software separately, and the many comments describing "how great this will be for the software industry," everyone seems to have overlooked something – IBM has, in its employ, some 45,000 programmers. With a staff of this size, and the number of years of experience in developing applications, how can IBM fail to produce effective software, if it wants to?

It would seem most inappropriate for anyone in this industry to claim that IBM cannot develop such software, when it has proven several times that it can and will do so, when necessary.

It has the most extensive information on the needs of computer users simply because over 70% of the users are constantly in touch with IBM representatives. IBM certainly has an enormous and effective information-gathering system, and is quite capable of making good use of it when it suits their goals.

We expect that IBM will compete with the software industry on a direct basis. It will plan, prepare, and market high-grade software at prices equal to or below those possible for anyone else in the industry. IBM can distribute costs for such developments over a huge customer base, therefore making the price per customer much more favorable then the development and marketing costs of a pure software house can possibly allow.

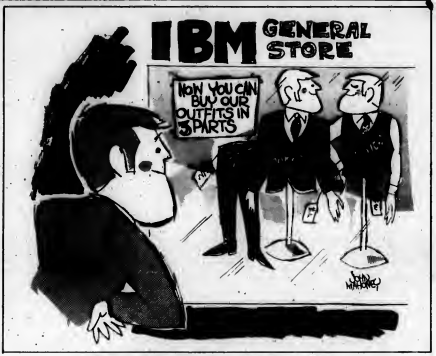
We expect that many users will find it advisable to take careful stock of the products which IBM makes available over the next few months, because, as one industry expert pointed out, "It ought to be like Sears Roebuck, you can choose from an, enormous catalog, with any price and any style you want."

Buffer Needed

Northeast Airlines' difficulties with its new computerized reservation system are not unexpected; problems are likely to occur when setting up a new system. This demonstrates again the impossibility of comprehensively testing new software, a topic covered in a front page article in CW two weeks ago.

What is unfortunate is that even though problems were expected, nothing was done to cushion the impact on passengers. Rather then provide a human buffer between computer decisions and passengers, Northeast's airport staff used the computer as an excuse for being less than helpful.

Increasingly the general public is coming to associate computarization with error and inconvenience. This trend will continue until the computer community realizes that its responsibility during the introduction of a new system is not limited to working out the bugs in the software. Since problems are inevitable, we also have a responsibility to see that extra effort is taken to cushion the impact of any errors on the public.



"Guess I'd Better Get Fashion Conscious in a Hurry."

Research Report

NBS Says Some Most Popular Programs Produce Less Accurate Least Squares

WASHINGTON, D.C. – The National Bureau of Standards Statistical Engineering Laboratory has studied the accuracy of computer programs for obtaining least squares representations of data and found that some of the most popular programs using naive matrix methods yield accuracy far inferior to those using more sophisticated techniques.

Roy H. Wampler, of the bureau's staff, evaluated 27 different computer programs by running two least squares test problems on each. Some programs, those based on mathematical algorithms using orthogonal polynomials, yielded acceptable accuracy, whereas those based on elimination algorithms gave poor results, some totally unacceptable.

A least square solution is an equation for which the sum of the squared deviations of the data from the curve is smallest.

Programs Used

The present study was undertaken to assess the numerical accuracy of representative least squares programs from a variety of sources. Many of them are subroutines in widely used computer systems and programs, which can be turned to like recipes in a cookbook. Included in the study were least squares programs from the University of California at Los Angeles biomedical computer programs collection, the C-E-I-R multiaccess computing services library, the IBM Share library, the System/360 scientific subroutine package, the Univac Math-Pack and Stat-Pack collections, and MIT's Project MAC 7094 disk files.

The programs studied used essentially four different algorithms: orthogonal Householder transformations, Gram-Schmidt orthonormalization, orthogonal polynomials, and Gaussian or Jordan elimination.

Four computers were used: a Univac 1108 located at the Bureau's Gaithersburg, Md., laboratory complex; an IBM 7094 at the Army's Harry Diamond Laboratories in Washington, D.C. (as well as one at MIT, Cambridge, Mass.); a time-shared GE-235 located at Bethesda, Md.; and a Univac 1107 in Washington.

Findings

Comparison of the coefficients reported from the computer runs disclosed that programs using orthogonal Householder transformations and Gram-Schmidt orthonormalization were much more accurate than those using elimination algorithms. The most successful programs were those that accumulated inner products in double precision and used iterative numerical refinement procedures.

Letters to the Editor

Immaturity Causes Software Problems

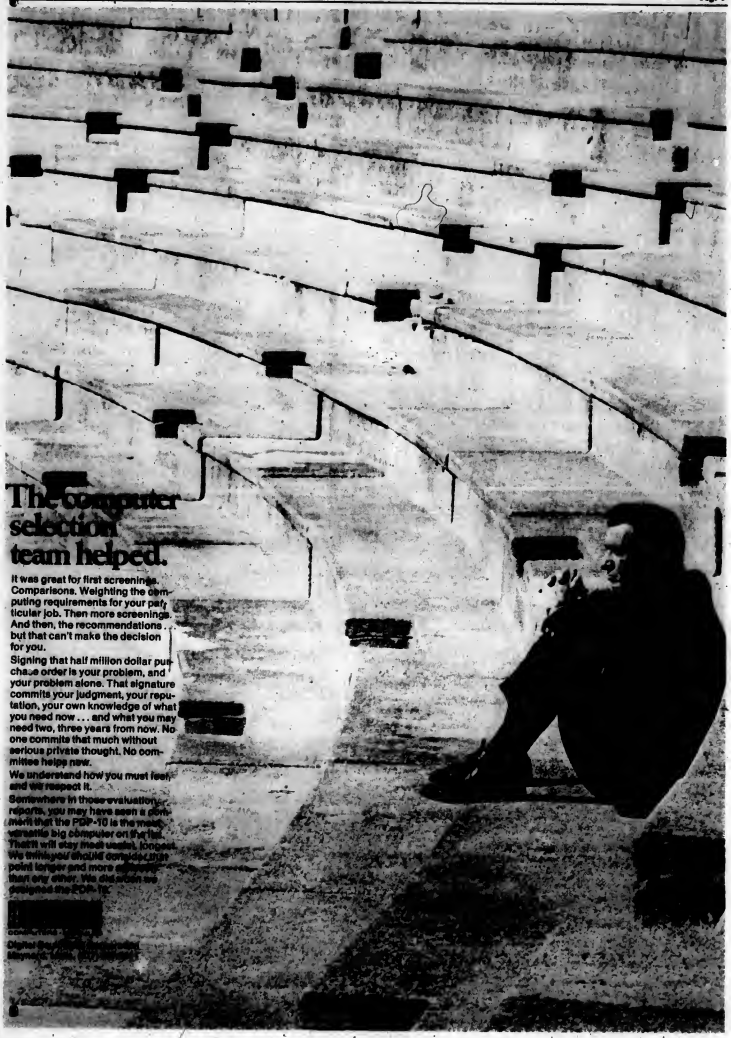
As you pointed out in the June 18 editorial, virtually no software is guaranteed. The reasons are obvious, but the remedy is not.

All mature industries and services have a developed technology. These technologies impose legal, professional and/or standard technical constraints to help the designer and producer avoid mistakes. Programming has not yet matured and "professional" is a misnomer for those who are merely better at "the art" than their fellows. This is not a question of capability or intelligence but of the absence of formal professional standards.

Such standards - among other things - separate the creative work, i.e., program design, from the area susceptible to a hard technology, which is the production of 100% tested error-free coding to meet the design. Until such standards and their accompanying technology are understood and implemented widely, we shall continue to suffer from programs which are "maintained" not "guaranteed."

All our software packages are guaranteed to meet their specification. Reassurance that we are not alone would be welcome.

Anthony B. Swanwick
Vice President
Hoskyns Systems Research, Inc.
New York



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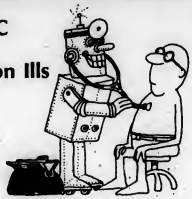

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Computer Designs System For Water Distribution

PONTIAC, Mich. – Water distribution systems, geared to meet the needs of subdivided municipalities into the 21st Century, are being designed by computer at Johnson & Anderson, Inc. here.

J&A, Michigan's largest civil engineering firm, utilizes a computer to plan fresh-water transmission and supply networks, storm sewers for rainwater and show-melt removal, and sanitary sewers – including pumping stations and waste-treatment facilities.

Included in a typical J/A designed system are laterals and mains ranging from 6 to 48 inches in diameter, multi-million-gallon capacity water tanks made of concrete for surface use, elevated steel tanks, and as many as 1,500 fire hydrants.

Philip M. Hampton, vice-president of the firm, said the computer is used in virtually every aspect of the design of these large systems, including mathematical simulation of each prior to final approval. Planning for a large system normally requires about a year to complete.

J&A begins its design of a system following a three- to six-month feasibility study. During this time, the municipality defines the service area and the company prepares a preliminary report establishing statistical information as to the need and financing for such a system.

"The first thing we then do is draw a base map of existing plats (legally subdivided properties) usually being served by septic tanks or well," Hampton said.

"This is accomplished through use of a mechanical plotter hooked directly to the IBM 1130 computer. Where old plats are encountered that may not be sufficiently detailed or accurate to be reproduced by plotter, a special coordinate-locating device is used. This determines lot lines, the location of corners, and other changes of direction.

"The information gathered is fed into the computer, which combines with the plotter to produce a plan-profile drawing of the service area showing existing physical features on the existing land curve," he said.

"In addition to the graph-like map, the computer prints out an English-language topographic description of the land."

At the same time the base map is being drawn, other J&A engineers are working with projected population and water consumption figures from the preliminary report in designing the components of the network.

"They compute the quantity of water to be delivered at a given pressure range for the average-day condition, maximum-day condition, and maximum-hour condition," Hampton explained.

At this point, the computer is used to simulate the proposed pipe network to verify that all conditions of supply can be met.

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Newest Eye Disease Detection Method Uses System Which Maps Vision Field

DALLAS – Eye specialists have developed a new method that promises to aid in the early detection and treatment of major causes of blindness, the University of Texas Southwestern Medical School at Dallas announced last week.

The testing method uses a data processing system, a rewired portable television set, and a modified program originally developed by IBM to make geologic maps.

The system produces maps of a person's field of vision, or total viewing area. By analyzing these maps, which resemble geologic maps, doctors will be able to recognize specific diseases that might not be detected by conventional tests, the university said.

"The public-health impact of this new system will be significant," said Dr. John R. Lynn, chairman of the school's department of ophthalmology, who guided development of the new technique.

The new system will be among the medical exhibits at the American Medical Association's annual convention in New York City this month.

"The seven major causes of blindness each affect a person's field of vision," Lynn said. "By analyzing electronically produced maps of one's field of vision, we can help diagnose an ailment at an early stage and then monitor the effects of treatment."

Often the onset of a disease and resulting change in one's field of vision are unnoticed, Lynn said. "Right now there are about one million Americans who have glaucoma – a disease leading to blindness – and don't realize it."

Because conventional tests for glaucoma and other major diseases affecting eyesight sometimes are not conclusive, particularly in the early stages, the field-of-vision test is especially valuable in early detection and treatment, he said.

While the value of detailed visual-field tests has long been recognized, such tests are not part of a routine examination, Lynn noted. The equipment is costly, examining technicians must be highly trained, and there can be a great degree of human error on the part of the technician, the patient, or both.

"Ophthalmologists have been reluctant to perform surgery on the basis of a test that may be unreliable due to human error. With the new technique, the IBM 1130 system will reduce this error and make the test more accurate," he said. "Our system will be able to do the tests better, faster, and at a lower cost than previous methods."

A patient undergoing the new test covers one eye and rests his head on a brace in front of a modified portable television screen connected to the data processing system. He focuses the free eye on a spot in the center of the screen.

The examiner then feeds punch cards into the system. The cards cause white dots of light, or "blips," to appear momentarily on the screen. The location, intensity, and size of each dot of light vary. As the patient sees a blip, he moves a lever below the TV screen toward the blip. Factors such as the speed and accuracy of the patient's responses are measured by the computer.

"After both eyes have been tested, a plotting device attached to the system will automatically produce an accurate and detailed map of the patient's field of vision, and we will then be able to begin diagnosis," Lynn said.

Once a patient's eye disease has been diagnosed and treatment started, he takes continued tests on the system, enabling ophthalmologists to see just how he is responding.

"We will be able to follow through with each patient and periodically check his progress to determine if our remedial action is effective," Lynn stated.

Costs using the new testing technique would be relatively low, he said, because several ophthalmologists – each with a testing screen – could share a single computer linked to their offices through regular telephone lines.

To illustrate a recent success in using the new testing technique, Lynn cited an instance in which an elderly woman began losing her eyesight. Doctors attributed the problem to a specific eye disease.

Patient, seated in front of a modified TV set, undergoes a field of vision examination at the University of Texas Southwestern Medical School, Dallas, Texas.

At the Southwestern Medical School, a field-of-vision test failed to support the earlier diagnosis. Instead it indicated the disorder was elsewhere. Physicians later found a brain tumor and removed it, fully restoring her vision.

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Now you can have a complete photographic processing laboratory attached to your computer.

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Series 1200 processors are available now. For the full story and/or a recommendation tailored to your individual requirements, call or write Mark Systems, Inc., 10950 North Tantau Avenue, Cupertino, California, 95014 (408) 253-8300

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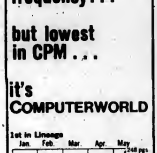

*Sample comparison based on 7" x 10" page advertisement each month.

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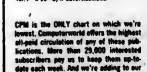

*cost per thousand based on one time rate for 7" x 10" b/w advertisement.

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Computer Daily – edited by Mike Blake, former editor of EDP Weekly – is prepared through an international staff of news correspondents specializing in the computer industry.

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Organizational Meeting Of CLDG Will Be July 11

NEW YORK – The Composite Language Development Group (the group now handling PL/1) of USA Standards Committee X3 will hold its organizational meeting at 10 a.m. July 11 at Bems headquarters, 235 East 42nd St., New York City. D.E. Eastwood of Bell Labs has been named chairman of the group.

X3 authorized the formation of this group to further develop the PL/1 programming language and directed it to collaborate with Technical Committee 2 of the International Federation for Information Processing (IFIP) and with TC10 of the European Computer Manufacturers Association (Ecma) to ensure that the composite language PL/1 would be in consonance with existing and draft USA and international standards.

A meeting notice and agenda has been sent to all persons who have been nominated for or who have requested membership in the group. Others interested in participating in the work should communicate with Eastwood at Bell Telephone Labs Inc., Whippany, N.J. 07981.

Two new committees provided for under the X3 reorganization plan have scheduled their initial meetings.

The Standards Steering Committee will meet in conjunction with the last meeting of the Systems Advisory Committee, both under the chairmanship of Eric Clamona, on July 8 and 9.

The Standards Planning and Requirements Committee will hold its organizational meeting on July 10. T.B. Steel, Jr. of Systems Development Corp., has been named chairman.

Computer Helps Give Librarians Catalog Cards

NEWPORT BEACH, Calif. – A computerized service that provides librarians with monthly sets of printed catalog cards on a wide range of technical, legal, educational, scientific, and religious books has been announced by Products of Information Systems, a newly formed information-retrieval company.

The service, known as the "Card-Mate Publication System," was described by Dr. Harold Jasper, firm president, as a "high-quality, low-cost system designed to provide libraries, research facilities, and other subscribers with cards for every book cataloged by the Library of Congress in the subject areas we cover. With our system, complete sets of catalog cards are received a few days after the Library of Congress completes its monthly cataloging of all newly acquired books. This is far in advance of time required with conventional methods.

"At the present time," Dr. Jasper explained, "many libraries have large backlogs of new books on hand but are unable to shelve or circulate them because they lack catalog cards. They have the choice of either waiting for printed card sets from the Library of Congress or performing original cataloging within the library. The high cost of original cataloging, and/or the delays and inefficiencies resulting from waiting for cards from conventional sources, prevents the library from making new titles immediately available to users.

The staff reviews daily the complete output of the Library of Congress, as represented by the Library's printed-card division. Cataloging for each title, exactly as done by the Library of Congress, is prepared for placement in the appropriate file and then is placed in protected storage in a large computer.

On the same day as the last catalog entry for the month is made, the automated selection routines are used to choose all titles in the current file for each card mate subscription category. Each group is then processed for typesetting, printing, and shipment to subscribing libraries.

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HONEYWELL
INC

July 2, 1969

AN OPEN LETTER TO CONCERNED COMPUTER MANAGEMENT:

Honeywell has addressed itself to an EDP industry-wide problem. A problem which has for too long been talked about and which, to date, has had too little done about it.

People. That's the problem. Too few people with too little of our industry's resources dedicated to educating them in the effective use of computers.

The problem is compounding. As the number of computer installations grows year by year, the competition for skilled computer people intensifies.

Honeywell has an answer. We surveyed the graduating class of '69 at many New England universities last fall. We told those seniors about the manpower problem in our industry. We also told them about the excitement and opportunity available. Then, we posed a solution to the industry's problem and their problem of choosing a challenging, rewarding career.

The answer is Honeywell's Postgraduate Education Program!

The program is running live. Graduates from eighteen universities are paying Honeywell to commandeer their summer. We're doing it with an intense, demanding curriculum designed to stretch their reach in all facets of programming, systems analysis and computer related management. Our end products are Candidates for management positions in the '70's, exactly the kind of people our industry needs today.

The curriculum includes: Fundamentals of Electronic Data Processing, Basic Business Programming, Cobol, Fortran, Assembly Language, Business Information Systems Analysis and Design, Operating Systems, Data Communications, Management Science and EDP Management. Constant computer interaction and limited class enrollments mirror the quality you'd expect from Honeywell.

Honeywell plans to expand this program. We are confident that you will want us to. Many of you have already expressed your interest in our graduates and your desire to use the Postgraduate Education Program to train your in-house candidates. For further information contact our Education Services Department, Wellesley Hills, Mass. 02181.

Maurice A. Longsworth Jr.

M. A. Longsworth, Jr.
Director of Marketing Support

ELECTRONIC DATA PROCESSING DIVISION 60 WALNUT STREET
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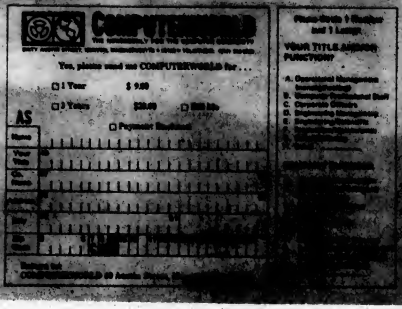

book reviews

Imaginary Computer Used To Teach Programming

Introduction to Computer Programming
by Rudd A. Crawford Jr. and David H. Copp
Publisher: Houghton Mifflin Co., Boston, Mass.

This is a workbook that allows school children to "program" computers without having a real computer. The work is based on a small, imaginary digital computer represented by diagrams.

This "computer" has 100 storage cells and two accumulators or registers, all of which can handle four digits together with signs. Typewriter input and output decisions and arithmetical operations are provided. An easily read, self-contained workbook contains answers to all exercises and tests at the back of the book.

Introduction to Computer Programming can be used formally in the classroom (requiring approximately four to six weeks of class time), informally in a school computer laboratory, or for independent study. It is a preparation for the study of higher-level computer languages such as Basic, Cobol, Fortran, or PL/I.

The Strategy of Change for Business Success
by Sidney Furst and Milton Sherman
Publisher: Clarkson N. Potter, Inc., New York, N.Y.

The book accents accounts from major industry figures who make decisions and control the mechanics of change. Analyses of particular products are included. Among them are the Xerox machine (Joseph C. Wilson, chairman of Xerox); color television (David Sarnoff, chairman of the board of RCA); and the Mustang (Lee A. Iococca, vice-president of Ford Motor Co.).

The book asserts that changes in the life styles of consumers result from the interaction of technological change and corporate decision-making. Case studies give an inside view of how corporations determine their course under these circumstances.

Compiling Techniques
by F.R.A. Hopgood
Publisher: American Elsevier Publishing Co., Inc., New York, N.Y.

Based primarily on Hopgood's own experience in England, the book provides a description of the techniques currently used in design and implementation of compilers. A large set of references is included which will be of particular value to students who wish to know where to look for further information. While the book is intended primarily for use in post-graduate courses, it will also appeal to programmers in general and others who require a readable introduction to this field.

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Computer Arts Festival Planned

SAN FRANCISCO – Music, paintings, drawings, sculpture, films, and even artistically weaved cloth are standard fare for an art festival. Limiting the invitation list to computers, however, is unusual.

But that's what was done at the Computer Music and Art Festival, August 26-28, as part of the Association for Computing Machinery's 1969 National Conference and Exposition at the San Francisco Civic Center.

A worldwide industry representation is expected to exchange technical information and discuss trends in the data processing industry.

Computers not only compose their own music, but some perform on tape as musical instruments. Others leave the renditions to musicians, and there are some examples of "computer rock."

The computerized pictures are paintings, drawings, and electronically retouched photographs composed of lines drawn by devices attached to computers.

Films submitted by computers to be shown at a "film festival" are both black and white and color and represent the latest techniques for producing animation electronically. Sculpture is the "bag" of one computer, while another will display cloth it helped design and weave.

Firms sponsoring entries in the festival include California Computer Products, Bell Telephone Labs, Burroughs Corp., Houston Instruments, Information International, IBM, Sandia Corp., and Stromberg.

AMA to Brief State Legislators

CHICAGO – The American Management Association has announced that its next briefing session has been scheduled for presentation Oct. 21-23 at AMA headquarters, 8655 W. Higgins Road, O'Hare Plaza here.

The session will be devoted to the subject, "EDP for State and Local Governments."

Announcement of more specific information regarding speakers and subjects will be made early in the fall.

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accepts the output from 60 or more key stations simultaneously

Time-shared input cuts data preparation costs 50%.

Now you can cut your computer input costs in half. This new innovation in data preparation techniques gives you two money-saving advantages over conventional keypunch or one-keyboard/one-magnetic-tape-per-operator systems: (1) the LC-720 employs a computer time-shared input; (2) it is the only system available that provides data output directly on IBM/360-compatible magnetic disc.

By time-sharing the data from 60 or more keyboard operators simultaneously, significant savings in data station costs of as much as 50% can be achieved. Costs drop to as low as $4300 per data station for a typical 60 station system. For large data preparation installations, the time-shared input is the only economical way to go.

Data entered into the LC-720 is processed by a small digital computer and stored on an IBM/360-compatible magnetic disc that provides the advantages of bulk storage and high speed random access of data. The problems associated with punched card handling or the mounting, pooling, merging and unmounting of magnetic tape reels are eliminated. All data is conveniently and economically stored in an IBM 1316 disc pack for direct high speed input to your modern data processing system. Naturally, an IBM/360-compatible magnetic tape is also provided with the system as standard equipment.

The LC-720 KeyDisc System also offers for the first time, data verification requiring one input pass only through the system, in addition to the normal technique of verification requiring two different operators. Record size is infinitely variable by each operator from 1 to 120 characters long and the system stores a large library of 30 or more different format control programs, all available simultaneously to any and all operators.

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To arrange for a demonstration, contact Gary Tischler, Director of Marketing (201) 334-3713

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New Literature

A brochure describing 6 seminars produced and carried out under the direction of the Director of the Foundation for Administrative Research, and a list of cities in which they will be conducted is available from Systemation, Inc., P.O. Box 730, Colorado Springs, Colo. 80901.

A short-form catalog describing a number of digital systems used for data acquisition and/or control of scientific analytical instruments has been published by Publications Dept., Datex Division of Conrac Corp., 1600 S. Mountain Ave., Duarte, Calif. 91010.

An illustrated, 12-page brochure on the large-scale GE-600 series of computers is available by writing General Electric Information Systems, Bldg. 6-207, Schenectady, N.Y. 12305.

A reversible divide-by-five counter, which can count up or down, is described in Note No. 104 from Wyle Computer Products, 128 Maryland St., El Segundo, Calif. 90245.

A supplement to the National Bureau of Standards catalog, which includes all published work by NBS authors from the middle of 1966 to the end of 1967, is available for $2. Write Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402; the Clearinghouse for Federal Scientific and Technical Information, Springfield, Va. 22151; or local U.S. Dept. of Commerce Field Offices. Specify NBS Special Publication 305.

Thick Film Circuits, a brochure describing the capability of hybrid circuits to bring together the best portions of monolithic integrated circuits, thick-film techniques, and discrete components, may be obtained by writing HEI, Inc., Jonathan Industrial Center, Chaska, Minn. 55318. Specify brochure No. HEI-111.

Descriptive literature outlining services of a computerized photographic typesetting firm is available from Bru-El Graphic, Inc., 5265 Port Royal Road., Springfield, Va. 22151.

A four-page brochure (GEA-8834A) demonstrates the capabilities of GE's Datanet-355, a stored-program adapter used as a communication processor. Write General Electric Information Systems, Bldg. 6-207, Schenectady, N.Y. 12305.

A booklet of practical data for ordering visual aids is offered by Admaster, 425 Park Ave. S., New York, N.Y. 10016.

A 35-page bulletin describes functional specifications, interfaces, and applications of Dignet 400 for data transmission up to 50 kilobits per second. Write General Electric Communication Products Dept., Section F, P.O. Box 4197, Lynchburg, Va. 24502.

A 16-page booklet directed at people who manage and operate data processing installations is available from Brandon Systems Institute, Inc., 1700 Broadway, New York, N.Y. 10019.

An 8-page brochure describing a system management and review technique may be obtained by writing Ralph Wagner, Moll Associates, 268 Centre St., Newton, Mass. 02158.

An illustrated, 4-page brochure (GEA-8804) describes GE's full-range capability to design a computer facility, build or remodel the facility, and install the system. Write General Electric Co., Bldg. 6-207, Schenectady, N.Y. 12305.

A manual and two workbooks covering the language evolved from Basic by Tymshare, Inc. for use by subscribers who dial directly into centralized computers via telephone or Teletype lines is available for $1.50. Specify Super Basic Manual, Tymshare, Inc., Library & Documentation Dept., 925 E. Meadow Drive, Palo Alto, Calif. 94303.

An 8-page catalog that presents key features, applications, and specifications on the Tempo I modular computer systems is available from Tempo Computers, Inc., 340 W. Collins Ave., Orange, Calif.

A brochure describing the Beta Com 600, a magnetic tape-to-transport microfilm system, may be obtained from Beta Instrument Corp., 377 Elliot St., Newton Upper Falls, Mass. 02164.

Description and specifications of Ampex Model TM-16200 digital tape memory is contained in brochure CO81, available by writing Lee Westfall, Ampex Corp., Mail Stop 7-14, 401 Broadway, Redwood City, Calif.

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A product of Payment Systems, Inc. (Dale L. Reistad, President), the MIND EXPANDER presents up-to-the-instant information on 25 or more color-coded, memo-sized cards easily routable to others in your organization who should also be updated. For starters, coverage will include:

fund transfer application ☐ new equipment ☐ retailing implications ☐ market facts/new market each month ☐ merchandising ideas ☐ money management ideas ☐ credit/identification cards ☐ the banking scene ☐ new ideas in payment systems ☐ consumer news ☐ significant installations and sales ☐ software and programming ☐ data collection and transmission ☐ legal aspects and recent rulings ☐ pilot test developments ☐ time sharing/terminals news ☐ fraud control ☐ fund transfer "stocks" ☐ conglomerates and congeneries ☐ the Washington scene ☐ personality spotlights ☐ who is saying what? ☐ news from overseas ☐ standardization programs ☐ calendar of events ☐ audit and control considerations ☐ the transportation industry ☐ sociological implications ☐ staffing and training problems ☐ educational aspects ☐ important statistics on fund transfers ☐ the bookshelf ☐

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New Inventory Control Package 'Aimes' at Retail Merchandising

DALLAS – A program designed to automate inventory control and provide up-to-the-minute data on pricing dynamics for retail merchants is now available from the Data Link division, the business data processing arm of University Computing.

The new program is called Aimes (automated inventory management evaluation system). "Aimes is unique in that it has been designed from the point of view of the retail merchant," said O.F. Shinn, vice-president, marketing, for the company. "Earlier efforts at automating retail operations were often designed from the computer's point of view and failed to do the job in the real world."

Ticket Processing

Aimes begins work by the initiation of an order for goods by a merchant. From this order, the computer prepares the marking tickets, either hand-tag or pressure-sensitive, that are waiting for the goods when they arrive at the retail outlet from the manufacturer. These marking tickets list all pertinent data about each item ordered, such as price, style, etc., as well as additional data needed for sophisticated computer reporting on the movement of these goods.

These computer-produced tags are multistub so that reports can be developed through several stages within a store until an item is sold. The tags also greatly reduce the time goods spend in manual marking rooms, sometimes as much as five days. "Speeding incoming goods onto the sales floor is the first way in which Aimes helps the merchant reduce his capital investment in stock," said Shinn.

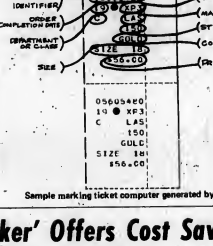
On the floor, the movement of tagged goods can be traced through daily computer reports if necessary. Merchants can identify both fast- and slow-moving items, trace trends in price and style choices, and recognize manufacturers and even particular order lots which have good or bad sales performance.

The multipart stub also permits rapid and more accurate taking of inventory. A "replica" inventory maintained in storage permits quick identification of significant sales movement (or non-movement) by a simple matching process. With Aimes, the company claims, the merchant can more effectively identify the time for markdowns, and better yet, establish the impact of the markdown upon the movement of goods.

Many Reports

The Aimes system is capable of yielding a wide variety of reports for the merchant. These include sales reports on fast- and slow-moving items and on-order liabilities, inventory performance, receiving, and markdown analysis. The modular nature of the Aimes system permits the merchant to select only the reports he needs for his operation.

Aimes service is available through any of Data Link's eight computer centers located in Dallas, Houston, Los Angeles, Oklahoma City, Raleigh, N.C., San Francisco, Seattle, and Shreveport, La. In addition, retail firms with their own computers may lease or buy the Aimes system outright for use on their own equipment.



Sample marking ticket computer generated by program

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1401 Systems wanted now, or will purchase now and lease back for later delivery.

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3. 403 A1 24mo. lease/purchase @ $325.00 IBM M/A

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Software 'Broker' Offers Cost Savings

BOSTON – Trading efficiency for resale possibilities may allow companies to recoup part of the cost of developing software packages, according to Cullinane Corp.

Cullinane proposes to develop software for clients in a fashion sufficiently general that it can afterward be marketed to noncompetitive companies. Kenneth Falor, manager of marketing services, said that increased generality would result in efficiency loss of no more than 15%.

No guarantee of other distribution is made by Cullinane, but it does agree to do a certain amount of advertising of the package, Falor said.

In its announcement, Cullinane claims that packages "are distributed on a shared-income basis, thereby recovering the cost of development for the original client. In many cases, original costs are completely recovered and substantial profits are realized."

But Falor conceded that as yet, no packages have been produced and distributed on this basis, and no orders have been received. The firm is, however, distributing packages written by other people.

Cullinane hopes to keep efficiency up by using "top-level programmers." Its current staff includes six senior programmers.

Greatest possible transferability will be insured, according to Cullinane, by the following:

- Main processing and subroutines would be clearly defined, with the use of segregated master files and report generators, and company names, etc., stored as data rather than written into a program.
- Coding would use advanced techniques to improve operating speed and efficiency, but not "tricky" shortcuts that add little to effectiveness, but detract from logic and clarity.
- In higher-level languages, operand names would be somewhat self-explanatory, and optional language features would be avoided where possible.

Real-Time Batch Offered For Sigma 2

LOS ANGELES – A real-time batch monitor (RBM-II) for use with Sigma 2 systems has been announced by Scientific Data Systems. RBM-II requires less core storage than the earlier version, RBM, and offers three additional service processors to the user: an upgraded debug package, a character-oriented communications handler, and an accounting subsystem, the company told CW.

The monitor offers an operating system that supports both multilevel real-time applications and background batch processing. It allows real-time programs to reside on the computer system's high-speed disk file and calls them when required, thus minimizing core storage requirements. This core-memory overlay feature also allows background programs to build variable branches, which SDS claims is a unique capability for a machine in the Sigma 2 price range, and permits large programs to be run on a small-memory system.

The design of RBM-II utilizes such Sigma hardware features as the base register, link register, memory protect, and priority interrupt system, as an integral part of the monitor's philosophy, resulting in efficiency combined with low residency requirements.

Keypunch/Keyverify Cost Control Programs Are Offered for S/360

NEW YORK – Two programs for evaluation and cost control – one for keypunch/key verify and the other for project management – are being provided through EPG Computer Services, Inc. for IBM S/360 users.

The company will be the exclusive agent for these packages, written and designed by Lotter and Heistrom of Chicago and will be providing both software and maintenance, an EPG spokesman said.

The Keypunch Performance System, a Cobol program for measuring the operating efficiency and speed of keypunchers and key verifiers, provides various types of performance reports on an individual and group basis. Project Management maintains and evaluates data on program design, production, and maintenance operations on a day-to-day basis, according to Erich P. Gurtner, company president.

Both systems are currently installed in several locations, and will be marketed through the company in Washington, New York, and the Northeastern U.S. from the company's offices here.

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Information Management for Banks Available Through Keyline Time-Sharing

CHICAGO – A time-shared management information service for banks is now available from Keyline, a recently formed subsidiary of Continental Illinois Bank and Trust Co.

The service gives a subscriber access to a library of programs to solve what Keyline calls "everyday financial problems." Access is through an electric typewriter connected by telephone lines to a large-scale computer.

The company makes available programs developed by Dynabank Corp., a national time-sharing service, as well as Continental's programs. Each member bank will be able to draw on special programs for municipal bond analysis and evaluation, financial forecasting, investment analysis, and others.

Updated 3 Times Daily

Through Keyline, Dynabank market development reports will be available to banks. Updated three times daily, a special program will give information on current market activities, Federal Reserve actions, significant market movements, bond offerings, and Treasury financing.

A set of simple commands typed into the terminal keyboard enables the subscriber bank to communicate with a computer center in Chicago.

"To use Keyline, the operator does not need to know computer programming," said a Continental officer. "The banker himself can work the keyboard. The terminal prints its answers in easy-to-read banking and financial terms."

Upgrade Offered from Eastern Office

SAN FRANCISCO – Upgrade, a program-conversion service, is now being offered by Information Management Inc. through its Eastern regional office in New York City. The success of the service, which up to now was offered only on the West Coast, has led to an extension to better accommodate East Coast customers, the company explained.

Upgrade translates 1401 Autocoder or machine-language production programs to Cobol. Upon receipt, a 1401 program is translated to Cobol and a clean compilation source deck is returned, the company said.

The price for the service is 60 cents per 1401 source card (comment cards excluded), with a minimum charge for the first program of $300. In the event that only an object deck is available, the price is an additional 20 cents per card after deassembly, with a corresponding minimum price of $400 per first program. Other options include leasing the Upgrade system and outright purchase. In both cases, IMI trains customer personnel on Upgrade operation.

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Leasco to Make Offer for Pergamon Press Ltd. Shares

NEW YORK – Leasco Data Processing Equipment Corp. intends to make an offer through N.M. Rothschild & Sons for all of the outstanding shares of Pergamon Press Limited, of London and Oxford, England, a quoted public company. The plan was announced jointly by Saul P. Steinberg, chairman of the board of Leasco, and Robert Maxwell, chairman and managing director of Pergamon. The total value of the contemplated transaction is about $60 million.

Leasco is established in the U.K. through its computer leasing and software operations and its management consulting subsidiary, Inbucon Ltd. Steinberg said, "The proposed merger creates a significant opportunity for the two companies to establish computerized data banks to serve the scientific and business communities."

Leasco proposes to offer a cash amount of $4.44 for each Pergamon share with an alternative of $4.44 face amount of a subordinated debenture convertible into Leasco common stock at $50 per share. In addition, it is further contemplated that Pergamon shareholders will receive a five-year warrant to repurchase one Pergamon share at $5.04 for each 10 Pergamon shares tendered to Leasco.

This offer is conditional upon obtaining Bank of England and governmental approvals.

Maxwell stated that he and his family interests, owning approximately 34% of the outstanding Pergamon shares, intend to accept Leasco's proposed offer; as to 25% of the outstanding stock they will accept the convertible stock offered and will tender the balance of 9% for cash. The directors of Pergamon, having consulted their financial advisors, Robert Fleming and Co., Ltd., propose to recommend the offer to all shareholders and will agree to accept it in respect of their own holdings.

Steinberg said that, in addition to the rights to be extended to tendering Pergamon shareholders, Leasco plans to offer further Pergamon stock sufficient to insure a continuing substantial direct British interest in Pergamon stock and an active London market for the stock. When sufficient stock is available a quotation will be sought also on the Paris, Frankfurt, Zurich, and Amsterdam Stock Exchanges.

Pergamon, quoted on the London Stock Exchange, is one of the world's largest publishers of technical, scientific, and educational books, journals and encyclopedias.

The quoted U.S. subsidiary of Pergamon, Pergamon Press, Inc., will not be affected by the proposed tender offer.

'Bank Wire' Converted to Private System

NEW YORK – "The Bank Wire," used to speed billions of dollars a day in fund transfers among 229 banks in 33 states and the District of Columbia, has been officially converted to a new, computerized private wire system by Western Union.

The largest banking network in the nation, The Bank Wire has 40,000 miles of high-speed communications circuits and handles more than 20,000 messages daily. It replaces a number of semiautomatic pushbutton systems in operation since 1950.

The new, computer-controlled system connects two large centers in New York and Chicago and three concentration centers in Atlanta, Dallas, and San Francisco.

Four Honeywell DDP-124 computers, supplied by Western Union, direct the system's operation. All main and concentration centers are connected with duplex, or two-way circuits with a speed of 3,000 words/min.

Computerization of the system and its special co[illegible] has increased the network's message-handling capacity by 50% and introduced automatic handling by computer.

Once a message is entered on a page teleprinter at the originating bank, it travels to its destination without manual handling or retransmission at any point. Computers check all messages automatically for proper destination and then flash them automatically to the proper banks.

Among the messages handled by The Bank Wire are money transfers on a bank-to-bank basis or for the account of third parties; security purchases; sales and quotations; credit inquiries and information; foreign exchange; letters of credit; and other transactions.

A unique feature of the system is the operation and maintenance of the two main computer centers by Western Union personnel to insure the confidential nature of all communications transmitted over the network. Each bank in the system sees only its own messages and has no access to the messages of others.

The Bank Wire's computerization was planned and sponsored by a group of New York and Chicago banks in cooperation with banks throughout the country.

Dataplan Is Set as Joint Venture

NEW YORK – The Interpublic Group of Companies and Informatics Inc., Sherman Oaks, Calif., have completed negotiations for the joint operation of Dataplan Inc., New York, a supplier of computer services in the marketing-communications field.

Informatics has acquired a 70% interest in Dataplan for $1.6 million and Interpublic retains 30% ownership. Interpublic also has signed a contract for Dataplan to provide data processing and computerized marketing to companies in the Interpublic Group and certain of its clients.

Dataplan's annual revenues are about $2 million and it will operate as a separate company.

Dr. Albert Madansky continues as president and board member of Dataplan. Three executives from Informatics and two from Interpublic, in addition to Madansky, will be on the board.

The Dataplan acquisition is another step toward the establishment of a national data services operation for Informatics, said Dr. Walter F. Bauer, Informatics president.

Two data centers in Northern and Southern California were purchased recently from the Rucker Co., Oakland, Calif.

Another center has been established in Los Angeles. Details of the Dataplan transaction were first disclosed in November, 1968.

CSC to Acquire Consulting Firm

LOS ANGELES – Computer Sciences Corp. has announced a plan to acquire the Commonwealth Services Companies through an exchange of stock. Commonwealth is based in New York.

The Commonwealth group, which recorded sales of about $20 million during the last calendar year, provides engineering and consulting services for management in fields which include transportation, distribution, industrial process, and public utilities. They also have interests in water desalinization, pollution control, and nuclear power station design.

The companies will be integrated into CSC's systems group, as a division.

Terms have not been announced, but a CSC spokesman said that details are being discussed, and will probably be released in one to two months, after regulatory agency approval has been obtained. The acquisition is expected to be on a pooling of interest basis.

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The Port of New York Authority invites proposals for four small scale digital computers, computer interface and peripheral equipment necessary for a traffic control system for the Holland and Lincoln Tunnels. The specifications call for hardware only; programming will be done by Port Authority staff. Sealed proposals will be received at the Office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York, New York 10011 until 11:00 AM o'clock, Friday, July 18, 1969, at which time and place said proposals will be opened and read.

Specifications detailing these requirements may be obtained at the Office of the Department of Purchase and Administrative Services.

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Dow Jones Down Slightly

Systems Sector Goes up 4.8%

By A.B. Williams
CW Staff Writer

Reaction to the last couple of disastrous weeks finally happened. During the week ended June 27, four of the five sectors went up, there were more gainers than losers, and even the leasing group had something of a breather.

The only good-sized gain was in the Systems Sector, up 4.8%, with IBM leading the way on a very healthy reaction to unbundling.

More On Unbundling

IBM has stated that it does "not anticipate an increase in its revenues over the short term as a result of these actions." It was referring, of course, to the 3% markdown in hardware prices, as measured against charges for products and services formerly given away. There can be no apparent question as to the meaning of "revenues." It must mean that first figure at the top of every IBM income statement.

The guts of IBM's market is in the low and medium price areas. At March 1, 1969, *EDP/IR's* computer census showed 33,950 System/360s either delivered or on order. Of that number, 30,870 were 20s, 25s, 30s, and 40s. In addition, the census showed 6,480 total bookings for 1130s.

These machines are sold in a very competitive market. At least until unbundling, many sales were won or lost on vendor support commitment – the amount of (often) pre-installation education and systems support the prospect could bargain for. IBM now is putting a price on the systems help, and on a good deal of the education.

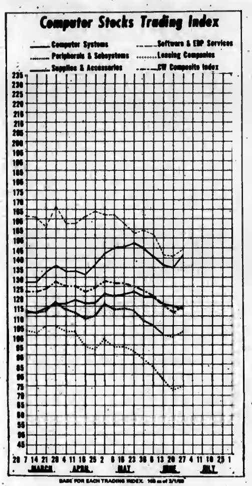
The new user, all users, require language processors. Whether the user is in new-write or maintenance, it's hard to imagine an installation getting by without compilers for all the languages it has used along the way. Language processors the user is likely to need will be priced at some point. While IBM has allowed itself leeway in this area by use of phrases like "future IBM computer programs," it's likely, at the very least, that some new products are on the way to replace most of the key items.

Let's look at a prospect about to sign up for a "huge" 20-5, with 32K, all the disks he can get, and a couple of tapes. His 3% saves him maybe $300 per month. This doesn't buy much systems help, let alone the compilers, sorts, etc., he'll need.

The only way IBM can stay at the same revenue, or less, is to stall announcement of new program products, or so it would seem. IBM used the term "revenues," not "profits" or any other.

There are a few points in IBM releases that could be a little clearer. "What is the exact status of new versions of current utilities and compilers?" is critical.

There are grey areas that make exact interpretation difficult or impossible. These will make it more of a chore for competitors to detail their answers, but the outline is clear enough to pave the way for a number of expected announcements.



BASE FOR EACH TRADING INDEX

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COMPUTER STOCKS: TRADING SUMMARY

WEEK ENDED JUNE 27, 1969

COMPUTER SYSTEMS

EXCH	1969 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK % CHANGE
N	140-120	137	BURROUGHS CORP	+ 10	7.67
N	69- 44	44 3/4	COLLINS RADIO	- 2 1/4	-4.79
N	159-125	149	CONTROL DATA CORP	+ 9	6.43
A	205-138	195	DIGITAL EQUIPMENT	+ 6	3.17
N	25- 16	17 5/8	ELECTRONIC ASSOC.	+ 3/8	2.17
N	98- 85	93 3/4	GENERAL ELECTRIC	+ 3/8	.41
N	95- 75	83 3/8	HEWLETT-PACKARD CO	- 2 1/2	-2.91
N	140-107	128 1/4	HONEYWELL INC	+ 1/4	.20
N	334-291	331 1/2	IBM	+ 19 1/4	6.16
N	139-100	105 3/4	NCR	+ 5 1/4	4.36
N	48- 41	41 1/8	RCA	- 3/4	-1.79
N	50- 32	33 3/8	RAYTHEON CO	+ 1 1/2	4.71
O	43- 24	32	SCI. CONTROL CORP.	+ 2 1/4	7.56
N	55- 44	53 5/8	SPERRY RAND	+ 2 7/8	5.67
A	36- 26	32	SYSTEMS ENG. LABS	+ 1 1/2	4.92

PERIPHERALS & SUBSYSTEMS

EXCH	1969 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK % CHANGE
N	82- 65	74 1/4	ADDRESSOGRAPH-MULT	+ 3 1/4	4.58
O	71- 20	26	ALPHANUMERIC	- 4 1/4	-17.53
N	44- 32	42 1/8	AMPEX CORP	+ 3	7.67
O	19- 10	12 3/4	BOLT/BERANEK & NEW	- 1/4	-1.92
N	17- 10	11 1/8	BUNKER-RAMO	- 1/8	-1.11
A	37- 27	27 7/8	CALCOMP	+ 1 3/8	5.19
O	38- 25	25 1/2	COGNITRONICS	- 1	-3.77
A	16- 11	11 3/4	COMPUTER EQUIPMENT	+ 1 1/2	14.63
A	27- 14	15 1/2	DATA PRODUCTS CORP	+ 3/4	5.08
O	22- 13	13 3/4	DIGITRONICS	- 1/2	-3.51
O	62- 46	52 1/2	ELECTRON MEMORIES	+ 1/2	.96
O	12- 9	9	FABRI-TEK	---	----
O	37- 20	20 1/2	FARRINGTON MFG	+ 1/2	2.50
O	81- 12	12 1/2	INFORMATION DIS	- 1 1/2	-10.71
A	34- 20	20 1/8	MILGO ELECTRONICS	- 1 1/2	-6.25
A	83- 59	83 3/4	MOHAWK DATA SCI.	+ 8 1/4	10.93
O	110- 54	60	OPTICAL SCANNING	+ 2	3.45
O	29- 10	22 1/2	PHOTON	+ 4 1/2	25.00
A	35- 26	27 3/8	POTTER INSTRUMENT	- 1 1/4	-4.37
O	76- 54	59	RECOGNITION EQUIP	- 1/2	-.84
A	30- 18	21 1/8	RIXON ELECTRONICS	+ 1 3/8	6.96
N	61- 28	29 1/2	SANDERS ASSOCIATES	+ 7/8	3.06
O	88- 39	39	SCAN DATA	- 2	-4.88
O	36- 19	19	TALLY CORP.	- 1	-5.00
N	275- 87	98 3/4	XEROX CORP	+ 9 1/8	10.18

SUPPLIES & ACCESSORIES

EXCH	1969 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK % CHANGE
O	47- 30	36 1/2	ACME VISIBLE	- 2	-5.19
N	22- 14	14 3/4	ADAMS-MILLIS CORP	+ 1/2	3.51
O	27- 23	24 3/4	BALTIMORE BUS FORM	- 1/4	-1.00
A	29- 18	21 5/8	BARRY WRIGHT	+ 1 1/8	5.49
O	44- 31	31 1/2	DATA DOCUMENTS	- 2 1/2	-7.35
N	42- 35	35 3/4	ENNIS BUS. FORMS	- 3/4	-2.05
N	89- 65	80	MEMOREX	+ 4 7/8	6.32
N	112- 94	101	3M COMPANY	- 3	-2.88
O	37- 29	31 3/4	MOORE BUS FORMS	- 5/8	-1.93
N	46- 36	39 3/4	NASHUA CORP.	+ 3/4	1.92
O	48- 36	36 1/2	REYNOLDS & REYNOLDS	- 1 1/2	-3.95
O	31- 23	25 3/4	STANDARD REGISTER	- 2 3/4	-9.63
N	36- 28	33	UARCO	- 3/8	-1.12
A	20- 13	14 1/4	WABASH MAGNETICS	+ 7/8	6.54
O	34- 29	32	WALLACE BUS FORMS	- 1	-3.03

SOFTWARE & EDP SERVICES

EXCH	1969 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK % CHANGE
O	14- 7	7	ADVANCED COMP TECH	- 3/4	-9.68
O	39- 29	29	APPLIED DATA RES	- 2	-6.45
O	19- 7	8 1/4	ARIES	+ 1/2	6.45
A	83- 63	74 1/8	AUTOMATIC DATA PRC	+ 2 1/8	2.95
O	13- 7	8 1/8	AUTO SCIENCES	+ 1/4	3.03
O	17- 10	11 1/2	BRANDON APPL SYS	- 1/4	-2.13
A	21- 13	13 3/4	COMPUTER APPL.	- 1/4	-1.79
O	16- 7	7 3/4	COMPUTER ENVIRON	+ 1/4	3.33
O	47- 27	27	COMPUTER NETWORK	- 3	-10.00
N	75- 49	63 5/8	COMPUTER SCIENCES	+ 2 1/8	3.46
O	40- 16	16	COMPUTER USAGE	---	----
A	56- 37	46	COMPUTING & SOFT	+ 5 1/4	12.88
O	24- 9	9 1/4	DATAMATION SERVICE	- 1/4	-2.63
O	17- 8	9	DATATAB	---	----
O	15- 6	6 1/8	DIGITEK	+ 1/4	4.08
A	38- 20	24 3/8	ELECT COMP PROG	+ 5/8	2.63
O	38- 20	24 1/2	INFORMATICS	+ 1/2	2.08
O	19- 4	4 1/2	MATRIX CORP.	---	----
O	22- 9	12	NAT COMP ANALYSTS	---	----
A	33- 23	29 3/4	PLANNING RESEARCH	+ 1 1/8	3.93
O A	11- 7	7 3/4	PROGRAMMING & SYS	- 1/4	-3.13
O	10- 6	7 1/4	SOFTWARE SYSTEMS	---	----
O A	37- 8	8	STRATEGIC SYS	- 2	-20.00
O	36- 11	21	TBS COMP CENT INC.	- 1 1/2	-6.67
O A	12- 5	5 3/4	UNITED DATA CENTER	---	----
O	155- 68	68	UNIVERSITY COMP	- 1	-1.45
O A	38- 26	26 3/4	URS SYSTEMS	- 1/4	-.93
O A	16- 9	9	U.S. TIME-SHARING	- 1	-10.00

LEASING COMPANIES

EXCH	1969 RANGE	CLOSING PRICE		WEEK NET CHANGE	WEEK % CHANGE
O	45- 25	25 1/2	BOOTHE COMPUTER	- 3 5/8	-12.45
O	10- 8	8	COMPUTER EXCHANGE	- 1	-11.11
A	34- 13	14 1/2	COMPUTER LEASING	- 5/8	-4.13
O A	14- 8	12 3/8	CONT COMPUTER	+ 1/8	1.02
O	10- 8	8 1/8	CYBER-TRONICS	- 1/8	-1.52
A	60- 31	34 1/2	DATA PROC. F & G	+ 1 5/8	4.94
O	16- 7	7 1/4	DATRONIC RENTAL	- 1/2	-6.45
A	52- 36	40	DEARBORN COMPUTER	+ 3/4	1.91
O	16- 10	11 3/8	DPA, INC.	+ 3/8	3.41
A	45- 25	26 3/4	GRANITE EQUIPMENT	+ 1/2	1.90
A	28- 16	16 7/8	GREYHOUND COMPUTER	+ 3/8	2.27
N	139- 28	38 3/4	LEASCO DATA PROC.	+ 1 1/8	3.00
O	9- 5	5 1/4	LECTRO COMP LEAS	+ 1/4	5.00
A	37- 28	30 1/8	LEVIN-TOWNSEND CMP	+ 3/4	2.55
O	8- 4	5	LNC DATA, INC.	---	----
O	14- 5	5 5/8	MANAGEMENT ASSIST	- 1/4	-4.26
A	39- 27	27 3/4	NATIONAL EQUIPMENT	- 1/2	-1.77
O A	12- 6	6	NCC LEASING	---	----
A	43- 22	24	RANDOLPH COMPUTER	+ 1	4.33
O	34- 9	9 1/2	SYSTEM CAPITAL	- 2	-17.39
A	28- 15	16	U.S. LEASING	+ 3/8	[illegible]

Earnings Reports

CLARY CORP.

3 Months Ended March 31

	1969	1968
Revenue	$2,197,000	$2,768,000
Earnings	(46,000)	269,000
(loss)		
Shr Erng	(.xx)	.28

COMPUTER INSTRUMENTS CORP.

18 Week Ended April 18

	a1969	a1968
Revenue	$2,066,103	$2,993,731
Earnings	(72,658)	295,379
(loss)		
Shr Erng	(.xx)	b.10
Tax Credit	9,000	87,000

a—Restated by company; b—Based on income before tax credit; c—Equal to 16 cents a share.

COMPUTER SCIENCES CORP.

Year Ended March 28

	a1969	b1968
Revenue	$64,583,000	$56,017,000
Earnings	c6,393,000	3,384,000
dShr Erng	1.25	.78
Spec Credit	e367,000	

a—Preliminary; b—Restated to reflect a pooling-of-interests acquisition; c—Equal to $1.33 a share; d—Based on income before special credit; e—Net gain on sale of investments

DIGITAL EQUIPMENT CORP.

3 Months Ended March 29

	1969	1968
Revenue	$21,371,900	$13,893,000
Earnings	2,457,100	1,592,000
Shr Erng	.82	.54

9 Months Ended March 29

	1969	1968
Revenue	$56,289,000	$37,646,000
Earnings	6,011,200	4,469,000
Shr Erng	2.01	1.53

AMERICAN COMPUTER LEASING

3 Months Ended March 31

	1969	1968
Earnings	$327,090	$123,311
Shr Erng	.18	.07

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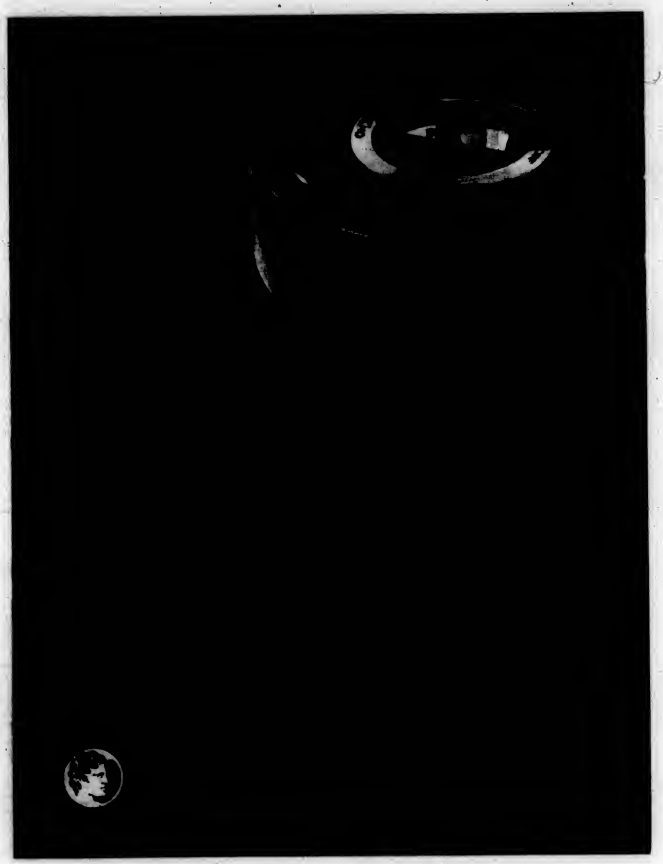
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